Offshore Production Buoy
Taking Onshore Processing Offshore

Standalone
Unmanned
Reusable

John Woods – May 2017
What is an OPB System?

- **Patented** system for exploitation of small, stranded oil reservoirs.
- Can be applied to early production, new field or brownfield development plus end of life decommissioning deferral.

- Principally consists of 2 elements;
  - Buoy – control, power generation and de-gassing
  - Tank – oil/water separation and oil storage
- Buoy is unmanned typically 28m diameter (12 m through waterline).
- 14,000 tonnes displacement.
- Size of system scalable to meet functional requirements.
- Autonomous – monitored remotely.

- Gas extracted and used for power generation (heating).
- Liquids pumped to tank.
- Tank is typically 200,000bbl storage.
- Gravity separation of oil and water.
- Heated liquids.
- Separated water received from tank, treated, monitored and discharged.

- Metering and oil export.
- Oil export route as required for field location (CALM, SAL or direct offloading).
Applications

• New field development
  – Low CAPEX and OPEX unlocks previously uneconomic reserves
  – Buoy is re-deployable allowing CAPEX to be spread across fields
  – Field clusters can be processed in single (or multiple) buoy and stored / exported from one (or more) tank

• Early production scheme
  – Extended (e.g. 3-5 year) early production scheme to evaluate appropriate full field development solution

• Intermediate production system
  – Complement existing facilities by de-bottlenecking through pre-processing of well fluids to remove water and re-injection produced water.

• Abandonment deferral
  – OPB can maintain production from subsea infrastructure after larger, more expensive FPSO has become uneconomic or host has shut down
Some Figures

“Classic” OPB

- Processing Capacity: 30,000 bopd, 45,000 blpd
- Gas handling: circa 9MMscf/d
- Hull diameter: 28m
- Column diameter: 12m
- Height: 62m
- Waterline: 35m
- Displacement: 14,000 tonnes
- Storage: 200,000 bbls oil
- Water depth: circa 100m (catenary) to 400m (tension tether)
- CAPEX: $160 million installed (excluding wells)
- OPEX: circa $20 million per year

*Dimensions and displacement can be adjusted to meet functional requirements and environmental conditions.*
Key Features

- **OPB system uses temperature based stabilisation**
  - Produced fluids are heated and degassed in the buoy
  - Gas used for power generation and heating
  - Up to 6 ESP drives can be installed for artificial lift
  - Power for water injection if required
  - Processing located below waterline (patented blast relief system for protection of maintenance personnel)
  - Subsea storage tank heated to allow very efficient separation of oil and water
  - Separated water returned to buoy for monitoring and discharge
  - Processing in climate controlled environment allowing efficient waste heat management.

- **Very stable platform**
  - Tank testing conducted on generic design
  - Low sail area and narrow waterline profile
  - Catenary or tension tether moorings designed
  - Patented installation method for tank

- **Low OPEX**
  - Normally unmanned – 4 planned maintenance visits (walk to work) per year plus allowance for 4 unplanned
  - Very simple processing plant. Autonomous operation monitored and directed from onshore
Design Status

- Proof of concept report complete
- Design manuals being issued under licence (26 in total) for OPB elements and systems
- Tank test of concept conducted (variant and field specific tank testing required)
- Mooring design for catenary and tension tether progressed for various marine environments
- Number of patents developed for system.
- Market assessment conducted (worldwide) and variants to “Classic” OPB identified
  - Deep water
  - Gas handling
  - Energy conversion
  - Increased storage
  - Increased throughput
- Engineering and construction partner (ODE) has assessed process design
- ODE has completed tank design and operation review
Next Steps

- Continue to develop the “Classic” OPB design
- Continue to engage with the market on variant designs
- Issue design manuals (under licence)
- Field specific studies
- Leading to concept select and development engineering

OPB engineering status is ready for field specific application evaluation
Questions ??

**OPB Energy Limited:**

Registered Office: 34 Albyn Place, Aberdeen, AB10 1FW, Scotland UK

**Contact Us:**

Enquiries, containing your contact details, regarding OPB Energy can be sent by email to: [info@opb.solutions](mailto:info@opb.solutions)

[www.opb.solutions](http://www.opb.solutions)